

REMARKS

Claims 1-20 are pending in the present application.

Claims 1-20 have been rejected.

Claim 1, Claim 10 and Claim 19 have been amended.

Claims 1-20 remain in the case.

Please reconsider Claims 1-20, as amended.

Amendments to the Specification

The Applicants have amended the specification to correct certain typographical errors. A sentence has also been added to Page 16 that reads "The emitters of transistors Q1 and Q2 are coupled to ground via resistor R3." This arrangement is shown in FIGURE 5. Therefore no new matter has been added to the specification by the amendment.

35 U.S.C. § 103(a) Obviousness

On Pages 2-6 of the August 3, 2004 Office Action, Claims 1-2, 4, 7-11, 13 and 16-20 were rejected as being unpatentable under 35 U.S.C. § 103 (a) over United States Patent Application Publication 2002/0160740 A1 of Hatcher et al. (hereafter "*Hatcher*") in view of United States Patent Application Publication 2001/0016017 A1 of Ishihara (hereafter "*Ichihara*"). Applicants respectfully traverse the Examiner's rejection of Claims 1-2, 4, 7-11, 13 and 16-20. Applicants respectfully

request the Examiner to withdraw the rejection of Claims 1-2, 4, 7-11, 13 and 16-20 in view of Applicants' amendments and remarks concerning the *Hatcher* reference and the *Ichihara* reference.

On Pages 6-7 of the August 3, 2004 Office Action, Claim 3 and Claim 12 were rejected as being unpatentable under 35 U.S.C. § 103 (a) over United States Patent Application Publication 2002/0160740 A1 of *Hatcher* and United States Patent Application Publication 2001/0016017 A1 of *Ichihara* in view of United States Patent Number 3,922,593 to McGuffin et al. (hereafter "*McGuffin*"). Applicants respectfully traverse the Examiner's rejection of Claim 3 and Claim 12. Applicants respectfully request the Examiner to withdraw the rejection of Claim 3 and Claim 12 in view of Applicants' amendments and remarks concerning the *Hatcher* reference and the *Ichihara* reference and the *McGuffin* reference.

On Pages 7-8 of the August 3, 2004 Office Action, Claims 5-6 and Claims 14-15 were rejected as being unpatentable under 35 U.S.C. § 103 (a) over United States Patent Application Publication 2002/0160740 A1 of *Hatcher* and United States Patent Application Publication 2001/0016017 A1 of *Ichihara* in view of United States Patent Application Publication 2003/0080809 A1 of McGrath (hereafter "*McGrath*"). Applicants respectfully traverse the Examiner's rejection of Claims 5-6 and Claims 14-15. Applicants respectfully request the Examiner to withdraw the rejection of Claims 5-6 and Claims 14-15 in view of Applicants' amendments and remarks concerning the *Hatcher* reference and the *Ichihara* reference and the *McGrath* reference.

During *ex parte* examinations of patent applications, the Patent Office bears the burden of establishing a *prima facie* case of obviousness. MPEP § 2142; *In re Fritch*, 972 F.2d 1260, 1262,

23 U.S.P.Q.2d 1780, 1783 (Fed. Cir. 1992). The initial burden of establishing a *prima facie* basis to deny patentability to a claimed invention is always upon the Patent Office. MPEP § 2142; *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984). Only when a *prima facie* case of obviousness is established does the burden shift to the applicant to produce evidence of non-obviousness. MPEP § 2142; *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Rijckaert*, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). If the Patent Office does not produce a *prima facie* case of unpatentability, then without more the applicant is entitled to grant of a patent. *In re Oetiker*, 977 F.2d 1443, 1445, 24 U.S.P.Q.2d 1443, 1444 (Fed. Cir. 1992); *In re Grabiak*, 769 F.2d 729, 733, 226 USPQ 870, 873 (Fed. Cir. 1985).

A *prima facie* case of obviousness is established when the teachings of the prior art itself suggest the claimed subject matter to a person of ordinary skill in the art. *In re Bell*, 991 F.2d 781, 783, 26 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1993). To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed invention and the reasonable expectation of success must both be found in the prior art, and not be based on an applicant's disclosure. MPEP § 2142.

Applicants respectfully submit that the Patent Office has not established a *prima facie* case of obviousness with respect to the Applicants' invention. Applicants direct the Examiner's attention to currently amended Claim 1.

1. (Currently Amended) A radio frequency (RF) down/up-conversion circuit comprising:
 - a local oscillator chopping circuit comprising:
 - a frequency divider circuit capable of receiving a first local oscillator (LO) signal having a frequency of LO and generating therefrom a frequency-divided second local oscillator (LO) signal having a frequency of LO/N and synchronized with said first LO signal; and
 - a multiplier capable of receiving said first and second LO signals and generating a signal that during selected periods of time has a signal polarity that is reversed relative to a signal polarity of said first LO signal; and
 - a differential radio frequency (RF) mixer having a first differential input port capable of receiving said signal from said multiplier and a second differential input port capable of receiving a first differential modulated radio frequency (RF) signal and a second differential modulated radio frequency (RF) signal, wherein said differential RF mixer generates a differential output signal (Emphasis added).

The Examiner has stated that *Hatcher* discloses a radio frequency (RF) down/up conversion circuit (108) comprising a differential radio frequency mixer (204) having a first differential input port (214, 216) and a second differential input port (206, 208) wherein the differential radio frequency mixer (204) generates a differential output signal (218, 200). (August 3, 2004 Office Action, Page 2, Lines 13-20). The Applicants respectfully disagree with the Examiner's assertion that circuit disclosed in the *Hatcher* reference is a radio frequency (RF) down/up conversion circuit. The circuit disclosed in the *Hatcher* reference is a direct current (DC) offset compensator that detects and compensates for DC offsets that result from the presence of interferor signals in an

incoming radio frequency (RF) signal. The *Hatcher* reference does not disclose or even mention down/up conversion circuitry.

The Examiner also stated that the *Hatcher* reference “does not disclose a local oscillator chopping circuit comprising: a frequency divider capable of receiving a first local oscillator (LO) signal having a frequency of LO and generating therefrom a frequency divided second local oscillator (LO) signal having a frequency of LO/N and synchronized with said first LO signal; and a multiplier capable of receiving said first and to second LO signals and generating a product signal of said first and second LO signals.” (August 3, 2004 Office Action, Page 2, Line 21 to Page 3, Line 2). Applicants agree that the *Hatcher* reference does not disclose a local oscillator chopping circuit of the type described and claimed by the Applicants. Applicants note that the *Hatcher* reference does not suggest the use of a local oscillator chopping circuit or even hint at the use of a local oscillator chopping circuit.

This is because the device that *Hatcher* is claiming is a direct current (DC) offset compensator 210 that is coupled to a prior art mixer circuit 204. The *Hatcher* reference clearly states that mixer circuit 204 is “a conventional direct conversion mixer.” (*Hatcher*, Page 3, Column 2, Lines 4-5). “Mixer 204 includes the well known Gilbert cell 310 and an RF input circuit 312.” (*Hatcher*, Page 3, Column 2, Lines 5-6). The *Hatcher* device is directed to detecting and compensating for the effects of direct current (DC) offsets in a radio frequency (RF) signal. There is no need for a local oscillator chopping circuit in the *Hatcher* device. *Hatcher* does not disclose, suggest, or even hint at the concept of using of a local oscillator chopping circuit.

The Examiner also stated that “The Ishihara reference teaches a local oscillator chopping circuit (30) comprising: a frequency divider circuit (31) capable of receiving a first local oscillator (LO) signal (40) having a frequency of LO and generating therefrom a frequency divided second local oscillator (LO) signal having a frequency of LO/N and synchronized with said first LO signal (see page 3, col. 2, paragraph [0041] and Figure 6); and a multiplier (32) capable of receiving said first and second LO signals and generating a product signal of said first and second LO signals (see page 3, col. 2, paragraphs [0042] to [0044], and Figure 6).” (August 3, 2004 Office Action, Page 3, Lines 3-9).

The Applicants respectfully traverse the assertion that the *Ishihara* reference teaches a local oscillator chopping circuit. The *Ishihara* reference teaches a quadrature modulator device that performs modulation of quadrature carrier waves with a digital baseband signal to deliver an output digital carrier signal. *Ishihara* does not disclose, suggest, or even hint at the concept of using of a local oscillator chopping circuit. Further, the *Ishihara* device, unlike the Applicants’ invention, changes the input frequency that is originally received from the local oscillator 40. Figure 6 and Figure 7 of *Ishihara* show that the output frequency of local oscillator 40 is f_{osc} . The output frequency of frequency conversion block 30 is $3/2 f_{osc}$.

The Examiner stated that “Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the circuit of Hatcher to comprise a local oscillator chopping circuit comprising: a frequency divider circuit capable of receiving a first local oscillator (LO) signal having a frequency of LO and generating therefrom a frequency divided second

local oscillator (LO) signal having a frequency of LO/N and synchronized with said first LO signal; and a multiplier capable of receiving said first and to second LO signals and generating a product signal of said first and second LO signals, as taught by Ishihara, in order to generate a carrier frequency which is different from the oscillation frequency and does not affect the oscillation frequency in the case of feedback of the output digital carrier signal.” (August 3, 2004 Office Action, Page 3, Lines 10-18). Applicants respectfully traverse this conclusion of the Examiner.

There is no suggestion in the *Hatcher* reference or in the *Ishihara* reference or in the prior art to combine the teachings of the *Hatcher* reference and the *Ishihara* reference. Under the applicable patent law, there must be some teaching, suggestion or motivation to combine the *Hatcher* reference and the *Ishihara* reference. “When a rejection depends on a combination of prior art references, there must be some teaching, or motivation to combine the references.” *In re Rouffet*, 149 F.3d 1350, 1355-56, 47 USPQ2d 1453, 1456 (Fed. Cir. 1998). “It is insufficient to establish obviousness that the separate elements of an invention existed in the prior art, absent some teaching or suggestion, in the prior art, to combine the references.” *Arkie Lures, Inc. v. Gene Larew Tackle, Inc.*, 119 F.3d 953, 957, 43 USPQ2d 1294, 1297 (Fed. Cir. 1997). The Applicants respectfully submit that there exists no teaching, suggestion or motivation in the prior art to combine the teachings of the *Hatcher* reference and the teachings of the *Ishihara* reference.

When two references are combined the combination of the references must teach or suggest all the claim limitations. In the present case, even if the *Hatcher* reference were combined with the *Ishihara* reference, the combination of the *Hatcher* reference and the *Ishihara* reference would not

teach, suggest or even hint at the Applicants' invention. This is because, as previously described, the *Ishihara* reference does not teach, suggest, or even hint at the Applicants' concept of a multiplier that is capable of receiving first and second LO signals and generating a signal that during selected periods of time has a signal polarity that is reversed relative to a signal polarity of the first LO signal. The Applicants respectfully submit that the rejections of Claims 1-2, 4, 7-11, 13 and 16-20 under 35 U.S.C. §103(a) combining the *Hatcher* reference and the *Ishihara* reference should be withdrawn.

Claims 2-9 are directly or indirectly dependent on amended Claim 1 and therefore incorporate the unique and novel elements of amended Claim 1. Claims 11-18 are directly or indirectly dependent on amended Claim 10 and therefore incorporate the unique and novel elements of amended Claim 10. Claim 20 is dependent on amended Claim 19 and therefore incorporates the unique and novel elements of amended Claim 18. The Applicants respectfully submit that dependent Claims 2-9, Claims 11-18, and Claim 20 are also allowable claims.

For the reasons set forth above the Applicants respectfully submit that the rejections of Claim 3 and Claim 12 under 35 U.S.C. §103(a) combining the *Hatcher* reference and the *Ishihara* reference and the *McGuffin* reference should be withdrawn.

Also for the reasons set forth above the Applicants respectfully submit that the rejections of Claims 5-6 and Claims 14-15 under 35 U.S.C. §103(a) combining the *Hatcher* reference and the *Ishihara* reference and the *McGrath* reference should be withdrawn.

The Applicants respectfully submit that Claims 1-20, as amended, are all patentable over the

cited prior art. The Applicants respectfully request that Claims 1-20, as amended, be passed to issue.

The Applicants deny any statement, position or averment of the Examiner that is not specifically addressed by the foregoing argument and response. The Applicants reserve the right to submit further arguments in support of their above stated position as well as the right to introduce relevant secondary considerations including long-felt but unresolved needs in the industry, failed attempts by others to invent the invention, and the like, should that become necessary.

SUMMARY

For the reasons given above, the Applicants respectfully request reconsideration and allowance of pending claims and that this Application be passed to issue. If any outstanding issues remain, or if the Examiner has any further suggestions for expediting allowance of this Application, the Applicants respectfully invite the Examiner to contact the undersigned at the telephone number indicated below or at *wmunck@davismunck.com*.


The Commissioner is hereby authorized to charge any additional fees connected with this communication or credit any overpayment to Deposit Account No. 50-0208.

Respectfully submitted,

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